Digital Radio Box

Verification and Visualization Tool for DAB Data Services

The flexibility of new digital radio broadcasting systems enables the provision of a wide range of media services to the end user; the most frequent of which are data services running in parallel to the typical audio service. The system stack of the Eureka-147-based digital radio (which includes DAB, DAB+, or T-DMB) typifies this flexibility by supporting the implementation of a wide variety of services, while providing a platform for the development of future services.

Atmel® offers a complete DAB solution, which includes an RF front end and a DAB-decoding baseband. The ATR2740 DAB baseband processor is a highly functional system-on-chip solution. Its flexibility enables the implementation of application-related tasks. This chipset forms the hardware basis for the Digital Radio Box, Atmel's verification and visualization tool for data-based services.

Digital Radio Box Overview

The Digital Radio Box is a flexible and effective tool, designed primarily for the demonstration and monitoring of data service applications. While it is not optimized for audio listening, it can be used for this purpose. The Digital Radio Box can be easily combined with external hardware (for example, navigational systems) for the provision of TPEG or Journaline® services. Users can also create customized PC-based software to demonstrate other data services as the Digital Radio Box, after decoding, streams out TPEG or Journaline related data groups to the host PC or laptop.

The Digital Radio Box is also perfectly suited for users interested in prototyping and testing or simply acquainting themselves with the data services provided via digital radio.

- Dimensions: 105 mm × 84 mm × 38 mm
- USB port on front for connection to the external host PC or laptop. Power can also be supplied through this USB interface
- Antenna connection points for looping into an existing antenna system
- Optional 12V DC connection

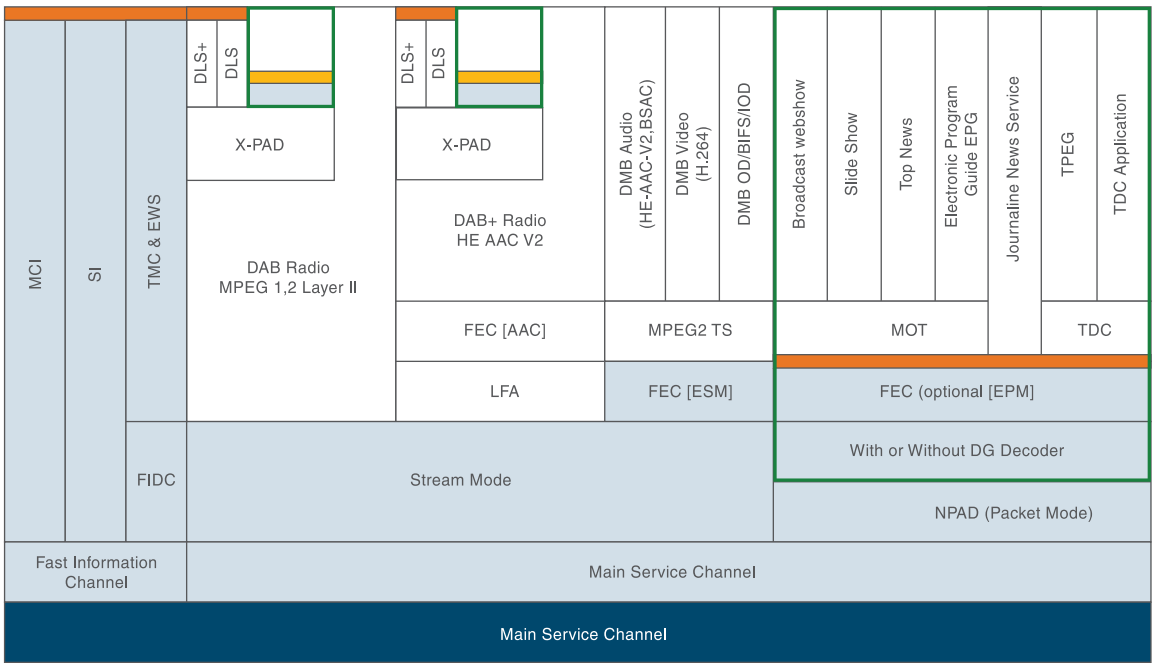
Features

- Supports Eureka-147 family standard including DAB, DAB+, and T-DMB
- Supports audio, video, and data applications including:
  - Audio streaming of a dedicated service selected via the host PC/laptop GUI without additional software
  - Video streaming (requiring an H264 software decoder running on the external host PC or laptop)
  - Data group streaming of 2 MSC sub-channels, e.g., 2 × NPAD or NPAD + XPAD
  - NPAD data decoding of Journaline, MOT-based data (such as BWS, EPG, or SLS), and TDC-based data (including TPEG and Data carried in the FIDC (TMC)

Software Details

- Flexible PC control via a USB connection using Atmel's standard software API for broadcast radio receivers, Digital Radio API, which is optimized for remote control
- Software supported by application notes, which describe the Digital Radio API user interface and the multi-client PC software
- Easy integration of additional software plug-ins to support new service decoding
- Two additional bundled software applications to support TPEG/TISA (TPEG Client Kit) and the Journaline news service
- Data services such as Slide Show, Broadcast Website, Electronic Program Guide, and Topnews require specialized external software, which must be run on the host PC or laptop

Protocol Stack



TPEG Client Kit by Fraunhofer FIRST

TPEG is a transmission standard used to provide traffic and travel information such as scenes and dates of accidents as well as traffic jam and road work information. This service also provides information about points of interest like hotels or car parks. The TPEG client software from Fraunhofer Institute for Computer Architecture and Software Technology (FIRST) decodes and de-serializes the received messages converting them into readable text, speech, or symbols. This software is optimized for portable platforms such as navigation devices and PDAs as it uses only limited resources. The TPEG client kit manages the communication with the receiver hardware, decodes the TPEG protocol, and converts this information into high-level objects after effective filtering.

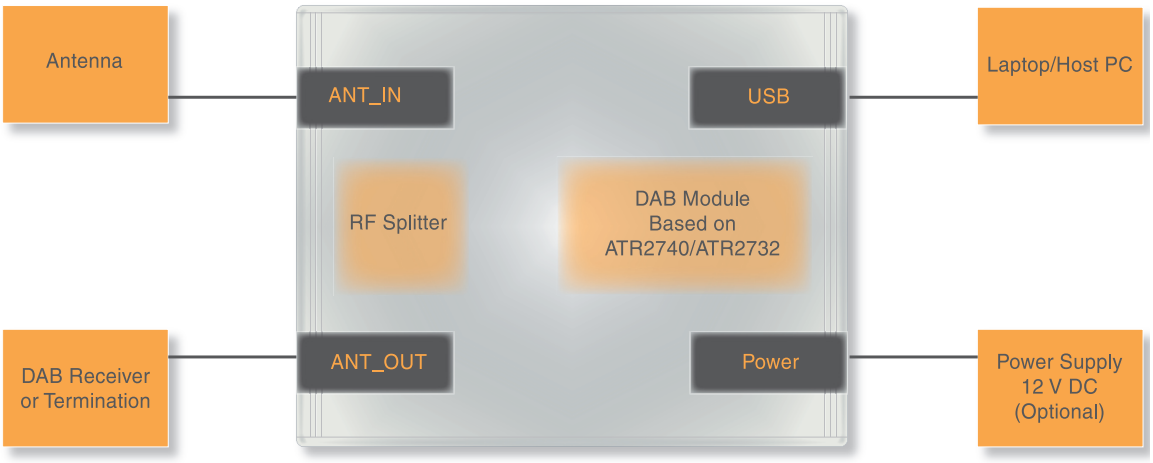
Journaline® – Interactive Information Service by Fraunhofer IIS

Journaline is an information service for digital radio, which allows the user to access textual information on demand. The information supplied includes both program-related information (last played songs, background on the current show, call-in numbers and contact information, station schedule overview, etc.) as well as program-independent information (ticker news, various detailed news categories, sports and financial updates, airport departure/arrival times, regionally sorted weather forecast, etc.). The assignment of information pages to the radio's station keys allows for single-click access to relevant information such as local weather forecast at a bedside-radio. Due to its efficiency and easy extensibility, Journaline supports the full range of radio receiver types, including specialized cases as used for in-car information provision. These specialized uses benefit from optional text-to-speech synthesis optimization and user profile personalization (e.g., providing all information of pre-selected categories as soon as updates were received).

Digital Radio Box Installation and Set-Up

Set-up and installation of the Digital Radio Box requires only a few simple steps:

- Control software for the Digital Radio Box along with two additional software applications to support TPEG/TISA (TPEG Client Kit) and the news service Journaline must be installed on the host PC or laptop.
- The Digital Radio Box is connected via a USB interface to the host PC or laptop.
- An in-built antenna splitter allows the integration of the Digital Radio Box into existing antenna systems via the antenna connection points on the front face of the box.
- Six LEDs also on the front face of the Digital Radio Box provide status feedback to the user.
- Power to the box is supplied via the USB interface or an external 12V (200 mA) supply.



Atmel's Digital Audio Broadcasting (DAB) ICs

Part Number	Description	Package
ATR2730	L-band Down-converter Inclusive PLL for DAB Receivers	SSO28
ATR2731	DAB One-chip Front-end Receiver with High Integration Level	SSO44
ATR2732N1	Highly Integrated One-chip DAB/DMB Front-end IC, Dual Band Automotive Compliant Variant	QFN64
ATR2740M1-RQHH	DAB Digital Processing Device; Highly Integrated Digital Device for DAB Radios	LQFP128

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Rev.: 9007A-DAB-07/08/00M

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